Space Weather Forecast

Issued on Friday, 24 May 2024 at 00:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Minor Radio Blackouts Likely at times throughout. Slight chance Minor Geomagnetic Storm Saturday 25 May.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate, with occasional Moderate-class flares observed. All of these emanated from a large and complex sunspot group in the southwest, peaking with an impulsive mid-ranking Moderate X-ray flare at 23/0216UTC.
This large and complex region is one of five numbered sunspot regions on the current disc, with two other small and simple unnumbered regions, one of which has recently rotated onto the northeast limb. Changes in the sunspot groups were generally small through the period, however the exceptions were the two large regions in the southwest, with one increasing in size to become a compact group, and the other simplifying from a complex to moderate geomagnetic complexity.
The period has been notably active in terms of Coronal Mass Ejections (CMEs). The first CME was from a very large partial filament lift off in the southeast quadrant which appeared to trigger two further filament eruptions in the southeast. Since then further CME's have emerged, one large CME linked to a long duration Moderate class flare around 23/1330 UTC and another smaller CME that appears to be from a region approaching the east limb from the far side.

Solar Wind / Geomagnetic Activity: Solar winds remained at background levels, with the associated magnetic field weak to occasionally moderate, and the north-south component of the magnetic field frequently weakly negative. The result was Quiet to Unsettled geomagnetic conditions, increasing to Active at the end of the day.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, despite several large potentially generative X-ray flares in the 24 hours.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is likely to continue, with isolated Moderate-class flares possible each day, and a slight chance of rising to High due to any Strong-class flares. These are most likely from the large and complex sunspot in the southwest. Two large sunspot groups are due to return over the next 24-36 hours (although notably not the Extreme geomagnetic storm producing region, with this due into the new UTC working week). It is uncertain how much of these regions have survived their transit across the far-side, and the overall risk of significant flare activity is gradually downward through the four-day period.

Solar Wind / Geomagnetic Activity: Currently there are no Earth-directed CMEs expected, although further analysis will be undertaken of the CME's observed so far.

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Met Office Space Weather Forecast

Background to Slightly Elevated solar winds are expected for much of the forecast period, but with a potential onset of a fast wind enhancement from a coronal hole feature from late tomorrow (25th) into day 3 (26th). Late day 4 (27th) a further solar wind enhancement, from a southern hemisphere coronal hole feature, is also possible. The solar winds may reach Elevated levels, but this is low confidence. There is a Slight Chance of Minor geomagnetic storm intervals being reached, most likely Saturday 25th May. Otherwise geomagnetic activity is expected to be mainly Quiet to Unsettled, but increasing Active at times tomorrow (25th).

Energetic Particles / Solar Radiation: High energy proton flux carries a daily slight chance of enhancement should any Moderate or Strong flares materialise. The chance of this occurring is expected to gradually reduce later in the forecast period as the larger spot groups reach the far side and rotate further away from the west limb

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	5	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	60	55	50	50
Very Active	R3 to R5 X	No	10	5	5	1

Solar Radiation Storms - (High Energy Protons):

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Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	20	15	10
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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